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April 8, 2005

**Via Hand Delivery**

Mary L. Cottrell, Secretary
Department of Telecommunications and Energy
One South Station
Boston, MA 02110

**Re: Commonwealth Electric Company d/b/a NSTAR Electric, D.T.E. 05-1**

Dear Ms. Cottrell:

Enclosed herewith for filing are the responses of Commonwealth Electric Company d/b/a NSTAR Electric to the second set of discovery of the Department of Telecommunications and Energy in the above-referenced proceeding.

Thank you for your attention to this matter.

Very truly yours,

David S. Rosenzweig

Enclosures

cc: Selma Urman, Hearing Officer
Amy Barad, Siting Division
William Febiger, Siting Division
Service List

**COMMONWEALTH OF MASSACHUSETTS**
**DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY**

| | | |
|---|---|---|
| Petition of Commonwealth Electric Company d/b/a NSTAR Electric for Approval of a Transmission Line in the Town of Barnstable Pursuant to G.L. c. 164, § 72 | ) | D.T.E. 05-1 |

## CERTIFICATE OF SERVICE

I certify that I have this day served the foregoing documents upon the service list in the above-docketed proceeding in accordance with the requirements of 220 C.M.R. 1.05.

Erika J. Hafner, Esq.
Keegan Werlin LLP
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Dated: April 8, 2005

Information Request DTE-2-1

Please refer to DTE-1-16.

a. Will the new DCT towers be placed adjacent to the existing DCT towers, versus in a more staggered fashion? Does the Company consider that adjacent placement of towers, where possible, is visually preferable?

b. Will the new towers be constructed of "weathering steel"? If so, will that match the existing structures on the right-of-way?

Response

a. The new double-circuit towers will be positioned upon the right-of-way based upon topography and safe ground clearances. In a few instances, the new towers will be placed within roughly 50 to 100 feet from being adjacent to an existing tower. The remainder of the towers will be staggered between the existing towers. Given that the existing right-of-way has several sets of towers in an area that spans only commercial and industrial facilities, the Company does not consider adjacent placement preferable or required in order to mitigate visual impacts.

b. The new towers will be constructed using weathering steel. The intent is that over time they will match the existing structures.

Information Request DTE-2-2

Please refer to DTE-1-2, DTE-1-9 and DTE-1-10. Does the insulating fluid qualify as a toxic or hazardous substance, as referred to in section 240-35(G)(2)(e) of the Barnstable Zoning Ordinances?

Response

Based upon the provisions in the Barnstable Zoning Code, it is unclear whether the insulating fluid qualifies as a "toxic or hazardous substance" particularly since the Company is not "storing" the fluid on site. Generally, it is the storage of hazardous substances rather than their use that is implicated under zoning bylaws. In order for the project to discuss the extent of any building permit and associated zoning requirements with the Town, the Company met with the Barnstable Building Inspector on April 4, 2005. The Building Inspector indicated that, because the new equipment was the same as the existing equipment, there would be nothing unusual about the Company's need for a building permit. A building permit will not be issued by the Building Inspector unless the project is in compliance with applicable zoning requirements. The Company will update the Department if any issues arise in the context of obtaining a building permit in Barnstable. Moreover, it is important to note that this site is the subject of a prior zoning exemption from the Department for substation and switching station facilities (D.P.U. 15687/15688/15689/15690).

Information Request DTE-2-3

Please refer to DTE-1-12.

a. Why would the electric fields at the Barnstable Switching Station be "increased slightly" where the station bus would be expanded? Is it because the bus would be closer to the fence line?

b. Would the direction of any change in magnetic fields at this location differ from that for electric fields, i.e., would the magnetic fields be the same or weaker than before the project? Please explain.

c. With respect to the electric and magnetic fields along the right-of-way west of the Barnstable Switching Station, what were the Company's methods for estimating the increases?

d. Are the absolute electric and magnetic field data available? If so, please provide.

Response

a. The electric fields at the Barnstable Switching Station will be increased slightly because of the expansion of the station bus. The addition of the new 115 kV line for Nantucket requires creating a new 4$^{th}$ bay to terminate the relocated Line #115. This involves expanding the station bus 70 feet southward within the existing Barnstable Switching Station and relocating Line #115 for the last two spans to line it up for connection to the new 4$^{th}$ bay.

b. The magnetic field changes at the Barnstable Switching Station are similar to the electric field changes because they both are created by the same facilities. However, the magnetic fields are more variable because they are created by the power flow, which differs for each transmission line and which changes continually, while the electric fields are created by the line voltage, which is constant.

The maximum magnetic fields at the Barnstable Switching Station fence occur where the transmission lines that connect to the station cross the station fence. The magnetic field changes along the Barnstable Switching Station fence line should be minimal because the total power flow through the station is not affected by the addition of the new 115 kV line to Nantucket and the physical changes in the station and the transmission lines at the station are also minimal.

The magnetic field along the west fence will be affected by the new 115 kV line and the relocation of the existing Line #115. The relocated line will not carry any more power nor produce any greater magnetic field than it did before, but its physical location will be shifted along the fence to the new entrance to the 4th bay. The new 115 kV line to the Merchant's Way Substation will carry no more power than a portion of the Nantucket load and the low field it creates will be at the fence location where Line #115 formerly entered the switching station. The magnetic field along the south fence will increase slightly because of the new station bus.

The magnetic field along the north fence will be reduced where Line #118 crosses the fence because some of the power that supplies Nantucket will be transferred from Line #118 to the new 115 kV line to the Merchant's Way Substation on the other side of the Barnstable Switching Station.

There is no change in the facilities along the east fence so there should be no change in the magnetic fields along this fence line.

c. The Company calculated the electric and magnetic fields for the right-of-way west of the Barnstable Switching Station by using a computer program named TLFIELDS developed by Power Technologies, Inc. The right-of-way was modeled with the physical layout and cable phase arrangement of the existing transmission and distribution lines on the right-of-way. A second model was developed that added the new 115 kV line for Nantucket. The model accounted for the different directions of power flow on the individual lines. The electric and magnetic fields were calculated for both peak and off-peak times, with and without the new 115 kV line to Nantucket operating.

Line loading used the actual line currents at 6 p.m. during the July 31, 2004 peak-day and at 4 a.m. during the May 3, 2004 light-load day. Line loading on the new 115 kV line to Nantucket was assumed at 50% of the Nantucket load during peak and off-peak conditions.

d. The calculated electric and magnetic fields on the edge of the right-of-way west of the Barnstable Switching Station are as follows:

| Electric Field (kV/Meter) | South Edge | North Edge |
|---|---|---|
| Existing | 0.038 | 0.525 |
| Future | 0.047 | 0.534 |
| Change | +0.009 | +0.009 |

| Peak Magnetic Field (mG) | South Edge | North Edge |
|---|---|---|
| Existing | 9.3 | 60.7 |
| Future | 9.4 | 60.3 |
| Change | +0.1 | -0.4 |

| Off-Peak Magnetic Field (mG) | South Edge | North Edge |
|---|---|---|
| Existing | 3.7 | 20.9 |
| Future | 3.7 | 20.7 |
| Change | 0.0 | -0.2 |

Information Request DTE-2-4

Please refer to DTE-1-14.

a. Would the reliability of service to other customers on Cape Cod be improved with the addition of the Special Protection Scheme, in the absence of the remainder of the proposed project to serve Nantucket?

b. In what way would the proposed expansion of the Barnstable Switching Station facilitate the addition of a fifth circuit breaker? Could the fifth circuit breaker also be added under any of the project alternatives considered?

Response

a. An SPS scheme could be implemented absent the project that could both interrupt service to non-firm customers and reduce the number of firm customers that would be interrupted for the overload conditions discussed in the filing. This would also require modifying the ring-bus and adding 115 kV breakers at Barnstable. Such an SPS scheme can offer reliability benefits to customer on Cape Cod.

b. The "fifth circuit breaker" simply adds a breaker to an existing position on the Barnstable ring bus that would separate the protection systems for the supply to one of the Hyannis transformers from other elements connected to the ring bus. The existing bus configuration at Barnstable would not accommodate the addition of this breaker, as it would circumvent the current process for relieving post-contingency voltage violations and overloads on the #115 line for simultaneous loss of the #122 and #120 lines. This fifth breaker could be added to options 7B or 7C for the proposed project.

Information Request DTE-2-5

Please refer to DTE-1-17(a). With regard to the "unacceptably low" voltage conditions on the #115 line, what, if any, voltage criteria would be violated? Would these criteria be violated even without the new Nantucket connection, or only with the addition of the new line? Please explain.

Response

The primary criterion employed for the supply system on Cape Cod is to maintain acceptable voltages across the distribution systems providing service to customers. The "unacceptably low" voltage conditions noted are associated with a depression in transmission voltages that the load tap changing equipment on substation transformers cannot reasonably compensate for, resulting in the potential for voltages to be below the ANSI standard for customer supply voltages under emergency conditions. These standards call for a minimum voltage of 114 volts under normal conditions and 112 volts under emergency conditions. The results of our analysis indicated voltage levels with the Nantucket load added to the #115 line would be below a level that would ensure that the required voltages could be maintained to our customers. Without this load addition, voltage levels on the transmission system are currently sufficient to maintain acceptable voltages to customers on the distribution system.

Information Request DTE-2-6

Please refer to DTE-1-20.

a. Are any new circuit breakers associated with either alternative 7A or 7B?

b. With alternative 7C, could an additional circuit breaker be added to the third bay, as in 7D? If so, would there be any difference in reliability between 7C and 7D?

Response

a. In alternative 7A, there are two new 115 kV circuit breakers at Barnstable Switching Station: breakers #1082 and #1182. In alternative 7B, the same two new breakers would also be installed.

b. A circuit breaker could be added in the third bay under alternative 7C. This would make the station configuration and station cost for alternative 7C identical to that for alternative 7D. The difference in reliability between alternative 7D and this modified version of alternative 7C would occur as a result of the difference in the configuration of the new segment of transmission line between Merchants Way Substation and the double-circuit tower. I n the case of "7C modified," the overhead crossing above the overhead wires of Line #115 and the 23 kV distribution lines adds a failure mode not present in alternative 7D, resulting in a lower level of reliability.

Information Request DTE-2-7

Please refer to DTE-1-19. Are the capacitor banks at Falmouth and Orleans, the additional breaker at Bourne, and the SPS at Barnstable complementary elements that would be needed with all the alternatives 7A, 7B, 7C, and 7D?

Response

Alternatives 7A, 7B, 7C and 7D all have two characteristics in common. First, they all place the firm load addition associated with the Nantucket line at the Barnstable Switching Station and, second, they all disable the existing load relief aspect of an open bus segment on the Barnstable ring bus. The need for the additional breaker at Bourne is required as a result of the firm load addition. The need for the SPS is due to the reconfiguration of the Barnstable ring bus. Accordingly, all alternatives require both upgrades.